

# ***UTILITY FLIGHT MANUAL***

## **X-15-2/3**

### **ADD-ON ROCKET AIRCRAFT FOR FLIGHT SIMULATOR**

Serial numbers: AF56-6671 & AF56-6672  
(XLR-99 engine)

ENGLISH VERSION 1.0



Desktop commanders are responsible for bringing this publication to the attention of all flight simulator enthusiasts and X-15 fans cleared for operation of subject add-on rocket aircraft.

Contains full product description and specifications, installation instructions, normal procedures and check list.

***Xtreme  
Prototypes***

[www.xtremeprototypes.com](http://www.xtremeprototypes.com)

## **X-15 FOR FLIGHT SIMULATOR SERIES**

## TABLE OF CONTENTS

FOREWORD		4
Section	I	INTRODUCTION AND PRODUCT DESCRIPTION 1-1
Section	II	SOFTWARE INSTALLATION 2-1
Section	III	AIRCRAFT DESCRIPTION AND SPECIFICATIONS 3-1
Section	IV	INSTRUMENT PANELS 4-1
Section	V	NORMAL PROCEDURES AND CHECK LIST 5-1
Section	VI	CONDENSED PROCEDURES AND CHECK LIST 6-1
APPENDICES		
Appendix 1:	QUICK-START PROCEDURES	A-1
Appendix 2:	INSTRUMENT READINGS	A-2
Appendix 3:	FS AIRCRAFT REFERENCE INFORMATION	A-3
Appendix 4:	PRODUCT SPECIFICATIONS	A-4
Appendix 5:	SELECTED INTERNET LINKS	A-5
Appendix 6:	SELECTED BIBLIOGRAPHY	A-6
Appendix 7:	OTHER X-15 FOR FLIGHT SIMULATOR PRODUCTS by Xtreme Prototypes	A-7

**X-15-3 (BALL NOSE, XLR-99 ENGINE,  
WING-TIP PODS VERSION)**

**GENERAL ARRANGEMENT**

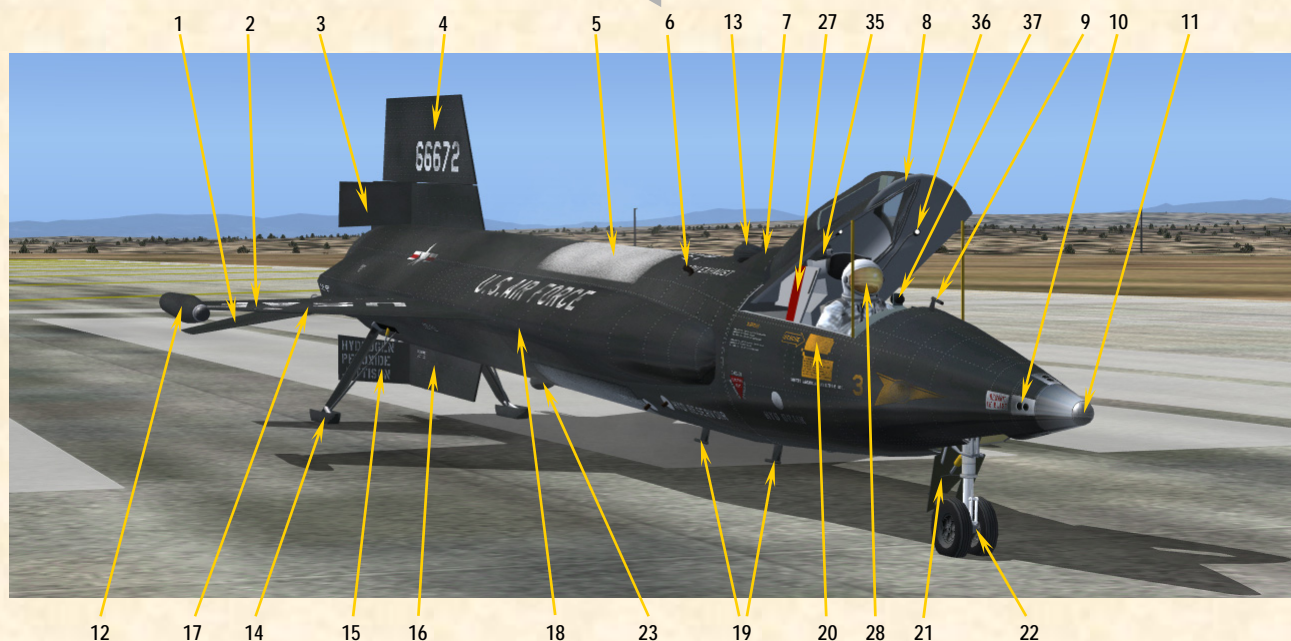
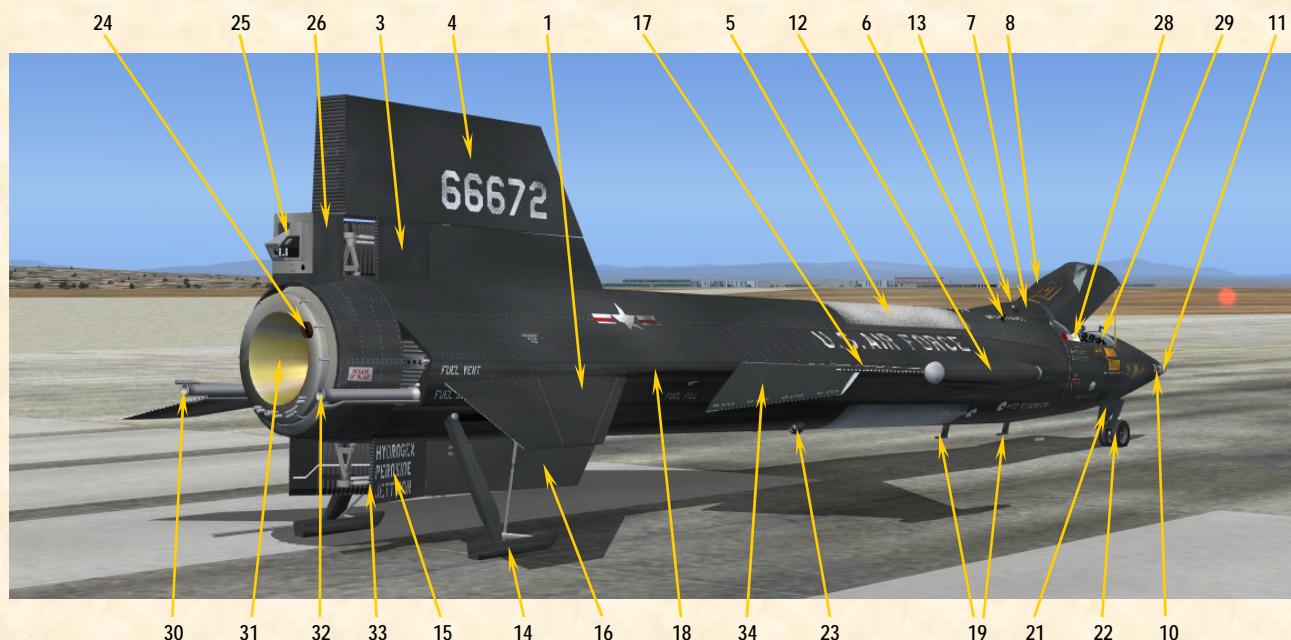


Figure 3-2

1. MOVABLE HORIZONTAL STABILIZER
2. BALLISTIC CONTROL SYSTEM ROCKETS (2, ON BOTH WINGS)
3. UPPER SPEED BRAKE
4. MOVABLE UPPER VERTICAL STABILIZER
5. LIQUID OXYGEN TANK (FROST)
6. APU EXHAUST (2, LEFT AND RIGHT)
7. EQUIPMENT COMPARTMENT
8. CANOPY
9. PITOT HEAD
10. BALLISTIC CONTROL SYSTEM ROCKETS (8)
11. NACA/NORTRONICS BALL NOSE
12. WING-TIP POD (2, LEFT AND RIGHT)
13. TOP BUG-EYE CAMERA PORT

14. REAR LANDING GEAR SKID (2, ON BOTH SIDES)
15. LOWER SPEED BRAKE
16. LOWER FIXED VERTICAL STABILIZER (MOVABLE VENTRAL REMOVED)
17. WING (2, LEFT AND RIGHT)
18. SIDE FAIRING (2, LEFT AND RIGHT)
19. LOWER UHF ANTENNAS
20. EXTERNAL CANOPY EMERGENCY JETTISON HANDLE ACCESS DOOR
21. NOSE LANDING GEAR DOOR
22. NOSE LANDING GEAR
23. VENTRAL BUG-EYE CAMERA PORT (2, ON BOTH SIDES)

24. ENGINE TURBOPUMP EXHAUST
25. RESEARCH INSTRUMENTS
26. TAIL-CONE BOX
27. EJECTION SEAT
28. PILOT (FULL PRESSURE SUIT)
29. INSTRUMENT PANEL
30. LIQUID OXYGEN JETTISON PORT
31. XLR-99 ROCKET ENGINE
32. AMMONIA JETTISON PORT
33. HYDROGEN PEROXIDE JETTISON PORT
34. FLAP (2, LEFT AND RIGHT)
35. COCKPIT CAMERA
36. COCKPIT LIGHT
37. ENGINE TIMER (STOPWATCH)





\* Gauges in gray do not perform any specific simulator function.

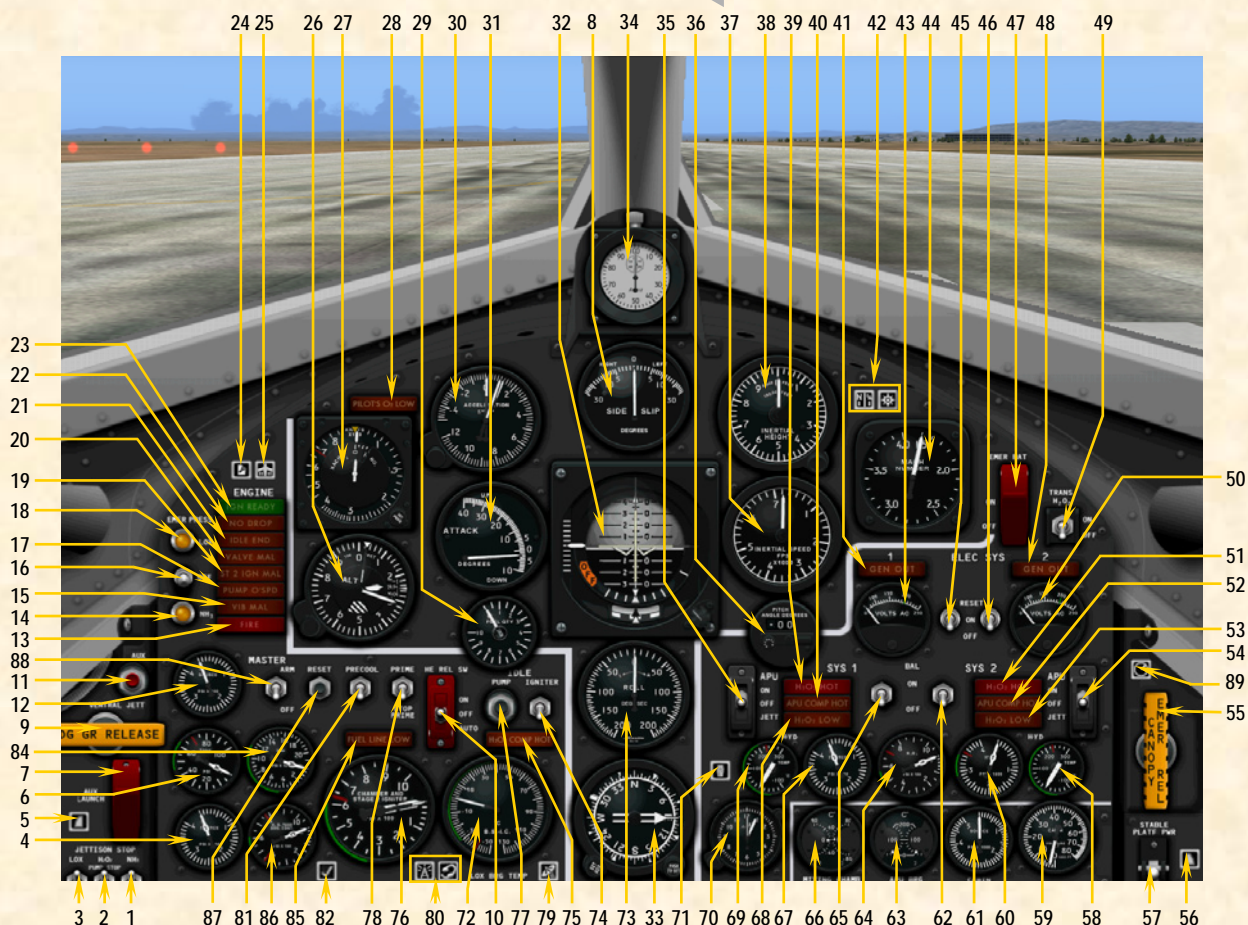


Figure 4-1

- |  |  |   |
|--|--|---|
| 1. AMMONIA JETTISON STOP SWITCH                                  | 30. ACCELEROMETER  | 60. HYDRAULIC PRESSURE GAUGE  |
| 2. H <sub>2</sub> O <sub>2</sub> JETTISON STOP SWITCH            | 31. ANGLE-OF-ATTACK INDICATOR  | 61. CABIN HELIUM SOURCE PRESSURE GAUGE  |
| 3. LIQUID OXYGEN JETTISON STOP SWITCH                            | 32. ATTITUDE INDICATOR   | 62. NO. 2 BALLISTIC CONTROL SWITCH  |
| 4. H <sub>2</sub> O <sub>2</sub> SOURCE AND PURGE PRESSURE GAUGE | 33. AZIMUTH/ADF INDICATOR  | 63. APU BEARING TEMPERATURE GAUGE   |
| 5. DISPLAY/HIDE LEFT SIDE PANEL ICON                             | 34. ENGINE TIMER (STOPWATCH)   | 64. APU H <sub>2</sub> O <sub>2</sub> TANK PRESSURE GAUGE                     |
| 6. PROPELLANT TANK PRESSURE GAUGE                                | 35. NO. 1 APU SWITCH   | 65. NO. 1 BALLISTIC CONTROL SWITCH  |
| 7. AUXILIARY LAUNCH SWITCH*                                      | 36. PITCH ANGLE SET CONTROL  | 66. MIXING CHAMBER TEMPERATURE GAUGE  |
| 8. SIDE-SLIP INDICATOR   | 37. INERTIAL SPEED (VELOCITY) INDICATOR  | 67. APU SOURCE PRESSURE GAUGE   |
| 9. LANDING GEAR HANDLE   | 38. INERTIAL HEIGHT (ALTITUDE) INDICATOR                                       | 68. NO.1 APU H <sub>2</sub> O <sub>2</sub> -LOW CAUTION LIGHT                 |
| 10. HELIUM RELEASE SELECTOR SWITCH                               | 39. NO.1 APU H <sub>2</sub> O <sub>2</sub> COMPARTMENT OVERHEAT WARNING LIGHT  | 69. NO.1 HYDRAULIC TEMPERATURE GAUGE  |
| 11. VENTRAL JETTISON BUTTON                                      | 40. NO. 1 APU COMPARTMENT OVERHEAT CAUTION LIGHT                               | 70. CLOCK   |
| 12. PROPELLANT SOURCE PRESSURE GAUGE                             | 41. NO.1 GENERATOR-OUT LIGHT   | 71. DISPLAY/HIDE CENTRAL PEDESTAL ICON  |
| 13. FIRE-WARNING LIGHT   | 42. DISPLAY/HIDE ICONS: COMPASS, MAP   | 72. LIQUID OXYGEN BEARING TEMPERATURE GAUGE                                   |
| 14. AMMONIA TANK PRESSURE-LOW CAUTION LIGHT                      | 43. NO. 1 GENERATOR AC VOLTMETER   | 73. RATE-OF-ROLL INDICATOR  |
| 15. ENGINE VIB MALFUNCTION CAUTION LIGHT                         | 44. MACHMETER  | 74. IGNITER IDLE SWITCH   |
| 16. PROPELLANT EMERGENCY PRESS. SWITCH                           | 45. NO.1 GENERATOR SWITCH  | 75. H <sub>2</sub> O <sub>2</sub> COMPARTMENT-HOT CAUTION LIGHT               |
| 17. TURBOPUMP OVERSPEED CAUTION LIGHT                            | 46. NO. 2 GENERATOR SWITCH   | 76. CHAMBER & STAGE 2 IGNITER PRESS. GAUGE                                    |
| 18. LIQUID OXYGEN PRESSURE-LOW CAUTION LIGHT                     | 47. EMERGENCY BATTERY SWITCH   | 77. TURBOPUMP IDLE BUTTON   |
| 19. STAGE 2 IGNITION MALFUNCTION CAUTION LIGHT                   | 48. NO. 2 GENERATOR-OUT LIGHT  | 78. ENGINE PRIME SWITCH   |
| 20. VALVE MALFUNCTION CAUTION LIGHT                              | 49. HYDROGEN PEROXIDE TRANSFER SWITCH  | 79. DISPLAY/HIDE GPS ICON   |
| 21. IDLE-END CAUTION LIGHT                                       | 50. NO.2 GENERATOR AC VOLTMETER  | 80. DISPLAY/HIDE ICONS: RADIO/ADF PANEL, ATC WINDOW                           |
| 22. NO-DROP OR 23-SECOND CAUTION LIGHT                           | 51. NO. 2 APU H <sub>2</sub> O <sub>2</sub> COMPARTMENT OVERHEAT WARNING LIGHT | 81. ENGINE PRECOOL SWITCH   |
| 23. IGNITION/READY LIGHT   | 52. NO. 2 APU COMPARTMENT CAUTION LIGHT  | 82. DISPLAY/HIDE KNEEBOARD ICON   |
| 24. DISPLAY/HIDE LEFT WHITE CONSOLE ICON                         | 53. NO. 2 APU H <sub>2</sub> O <sub>2</sub> -LOW CAUTION LIGHT                 | 83. NOT IN USE  |
| 25. DISPLAY/HIDE THROTTLE AND SPEED BRAKE PANEL ICON             | 54. NO.2 APU SWITCH  | 84. PROPELLANT MANIFOLD PRESSURE GAUGE  |
| 26. ALTITUDE   | 55. CANOPY INT. EMERGENCY JETTISON HANDLE                                      | 85. FUEL LINE-LOW CAUTION LIGHT   |
| 27. AIRSPEED/MACH INDICATOR                                      | 56. DISPLAY/HIDE RIGHT PANEL ICON  | 86. H <sub>2</sub> O <sub>2</sub> TANK AND ENGINE CONTROL LINE PRESSURE GAUGE |
| 28. PILOT'S OXYGEN-LOW CAUTION LIGHT                             | 57. STABLE PLATFORM SWITCH   | 87. ENGINE RESET BUTTON   |
| 29. FUEL QUANTITY GAUGE  | 58. NO. 2 HYDRAULIC TEMPERATURE GAUGE  | 88. ENGINE MASTER SWITCH  |
|  | 59. CABIN PRESSURE ALTITUDE  | 89. DISPLAY/HIDE SERVICE PANEL ICON   |

19. Mixing chamber temperature gauge [66, fig. 4-1, 4-2, 4-3; 61, fig. 4-4] – **Check**.
20. APU bearing temperature gauge [63, fig. 4-1, 4-2, 4-3; 62, fig. 4-4] – **Check**.
21. Cabin source pressure gauge [61, fig. 4-1, 4-2, 4-3; 59, fig. 4-4] – **Check**.
22. Cabin pressure altimeter [59, fig. 4-1, 4-2, 4-3; 60, fig. 4-4] – **Check**.

Center pedestal (stability augmentation system panel, if available, and research instrumentation panel):

1. Click the **DISPLAY/HIDE CENTER PEDESTAL** icon [71, fig 4-1, 4-2, 4-3, 4-4] at the center of the main panel to display the center pedestal (or select **CENTER PEDESTAL** from the “Instrument Panel” menu, under the “View” menu of the main Flight Simulator window menu bar).
2. Undock and reposition the panel if necessary.
3. Pitch function switch [32, fig. 4-11] – **STDBY**.
4. Roll function switch [31, fig. 4-11] – **STDBY**.
5. SAS test switch [7, fig. 4-11] – **Check OFF (CENTER)**.
6. Yar function switch [6, fig. 4-11] – **STDBY**.
7. Yaw function switch [5, fig. 4-11] – **STDBY**.
8. SAS caution (amber) lights (four) [1-4, fig. 4-11] – **Check ON**.
9. SAS gain selector knobs [8, 29-30, fig. 4-11] – Set to **LO**.
10. Ball nose test button (if ball nose is installed) [25, fig. 4-11; 6, fig. 4-12] – **Check (normal)**.
11. Engine oscillograph record switch [11, fig. 4-11] –



**OFF.**

12. Ram-air lever [28, fig. 4-11; 15, fig. 4-12] – **OPEN**.
13. Radar beacon switch [22, fig. 4-11; 13, fig. 4-12] – **OFF**.
14. Instrumentation master power switch [10, fig. 4-11; 14, fig. 4-12] – **OFF**.
15. Stable platform instrument switch [21, fig. 4-11; 9, fig. 4-12] – **ON**.
16. Ball nose power switch (if ball nose is installed) [9, fig. 4-11; 5, fig. 4-12] – **ON**.
17. Engine vibration recorder switch [18, fig. 4-11] – **OFF**.
18. Cockpit ram-air knob [17, fig. 4-11; 10, fig. 4-12] – **OFF (in)**.
19. DC voltmeter selector switch [20, fig. 4-11; 12, fig. 4-12] – **BUS**.
20. DC voltmeter [19, fig. 4-11; 11, fig. 4-12] – **Check (28-volt bus or 24-volt strain gauge or battery)**.

Center pedestal or main panel (MH-96 system control panel on X-15-3):

1. Pitch, roll and yaw damper switches [1-3, fig. 4-14] – **OFF (DOWN)**.
2. Pitch, roll and yaw gain selector switches [8-10, fig. 4-14] – **FIXED GAIN (DOWN)**.
3. CSS switch [4, fig. 4-14] – **OFF (DOWN)**.
4. Auto-trim selector switch [5, fig. 4-14] – **NORMAL (DOWN)**.
5. Reaction controls switch [6, fig. 4-14] – **OFF (DOWN)**.
6. Roll trim knob [7, fig. 4-14] – **CENTER**.





## PRELAUNCH

### BEFORE COUNTDOWN

Before countdown, complete final cockpit check as follows:

1. Ram-air lever [28, fig. 4-11; 15, fig. 4-12] – **Check CLOSED.**
2. Ventral arming switch [3, fig. 4-7] – **Check ARM.**



APUs:



1. APU switch No. 1 [35, fig. 4-1, 4-2, 4-3; 67, fig. 4-4] – **ON.** As APU No. 1 comes up to speed, hydraulic pressure will increase and then stabilize at 3000 to 3500 psi.
2. No. 1 generator switch [45, fig. 4-1, 4-2, 4-3; 44, fig. 4-4] – Move No. 1 generator switch momentarily to **RESET**, then to **ON**.
3. No. 1 generator out (amber) light [41, fig. 4-1, 4-2, 4-3; 42, fig. 4-4] – Check **OFF**.
4. APU switch No. 2 [54, fig. 4-1, 4-2, 4-3, 4-4] – **ON.** As APU No. 2 comes up to speed, hydraulic pressure will increase and then stabilize at 3000 to 3500 psi.
5. No. 2 generator switch [46, fig. 4-1, 4-2, 4-3; 49, fig. 4-4] – Move No. 2 generator switch momentarily to **RESET**, then to **ON**.

6. No. 2 generator out (amber) light [48, fig. 4-1, 4-2, 4-3; 47, fig 4-4] – **Check OFF.**



*When the APUs are operating, steam should be observed coming out of the APU exhaust pipes.*

7. Stable platform power switch [57, fig. 4-1, 4-2, 4-3; 58, fig. 4-4; 9, fig. 4-7] – **INT (up position).**
8. Service panel external power switch [24, fig. 4-5] – **OFF.**
9. Service panel external power (yellow) light [25, fig. 4-5] – **Check OFF.**
10. No. 1 generator voltmeter [43, fig. 4-1, 4-2, 4-3; 45, fig. 4-4] – **Check (200 volts, internal).**
11. No. 2 generator voltmeter [50, fig. 4-1, 4-2, 4-3; 45, fig. 4-4] – **Check (200 volts, internal).**
12. Hydraulic pressure gauge [60, fig 4-1, 4-2, 4-3; 36, fig. 4-4] – **Check (both pointers, 3000 to 3500 psi).**
13. DC voltmeter selector switch [20, fig. 4-11; 12, fig. 4-12] – Check **BUS**.
14. DC voltmeter [19, fig. 4-11; 11, fig. 4-12] – **Check (28 volts).**



**NOTE:** The prime can be stopped at any time by placing the engine prime switch at **STOP PRIME**. This closes the liquid oxygen and NH<sub>3</sub> tank main propellant valves and the H<sub>2</sub>O<sub>2</sub> safety valve.

13. Chamber and stage 2 igniter pressure gauge [76, fig. 4-1, 4-2, 4-3; 28, fig 4-4] – **Check (both pointers, 0 psi).**
14. Liquid oxygen bearing temperature gauge [72, fig. 4-1, 4-2, 4-3] – **Check.**
15. H<sub>2</sub>O<sub>2</sub> source and purge pressure gauge [4, fig. 4-1, 4-2, 4-3, 4-4] – **Check (pointers 1 and 2, 3000 to 3900 psi).**
16. H<sub>2</sub>O<sub>2</sub> tank and engine control line pressure gauge [86, fig. 4-1, 4-2, 4-3; 79, fig. 4-4] – **Check (both pointers, 575 to 615 psi).**
17. Propellant pump inlet pressure gauge [8, fig. 4-2, 4-3; 74, fig. 4-4] – **Check (both pointers, 45 to 65 psi).**
18. Turbopump idle button [77, fig. 4-1, 4-2, 4-3; 78, fig. 4-4] – **Push once.** This will start the engine turbopump and hot exhaust gas will be emitted at the back of the aircraft.
19. Propellant manifold pressure gauge [84, fig. 4-1, 4-2, 4-3; 72, fig. 4-4] – **Check (both pointers, 300 to 450 psi).**



Turbopump operation.

The manifold pressure will increase during engine operation and will vary according to the movement of the throttle. Make sure that the throttle on your joystick is set to its minimum position:

20. Move the throttle on your joystick to its maximum (forward) position. **Then pull the throttle back to its minimum position.**
21. Telemeter and radar switches [13, 22, fig. 4-11; 16, 13, fig. 4-12] – **Recheck.**
22. Telemeter commutator motor switch [16, fig. 4-11; 17, fig. 4-12] – **Check ON.**
23. Communications – **Check.**

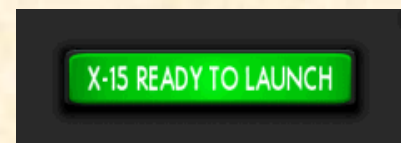
*In the real world:* Check communication with ground station, carrier pilot, and chase pilots.

24. Ready-to-Launch switch [3, fig. 4-9; 82, fig. 4-2, 4-3; 76, fig. 4-4] – **ON.**



*In the real world:* Verbally check with carrier pilot and launch operator that the Ready-to-Launch light is on.

25. Ready-to-Launch (green) light on Service Panel [11, fig. 4-5] – **Check ON.**



Operation of igniter idle is limited to 30 seconds. When 7 seconds remain of the normal igniter idle phase, the no-drop or 23-second (amber) caution light [22, fig. 4-1, 4-2, 4-3; 21, fig. 4-4] will come ON. With the no-drop or 23-second (amber) caution light on, the pilot must terminate the igniter idle phase – by moving the engine prime switch to **STOP PRIME** – or continue on to the launch phase.

*In the real world:* The igniter idle phase must be terminated immediately if the idle-end (amber) caution light [21, fig. 4-1, 4-2, 4-3; 20, fig. 4-3]





comes on, as damage to the engine chamber will occur because of insufficient cooling.

26. Igniter idle switch [74, fig. 4-1, 4-2, 4-3; 75, fig. 4-4] – **IGNITER**.

When the igniter idle switch is placed to **IGNITER**, the ignition-ready light [23, fig. 4-1, 4-2, 4-3; 22, fig. 4-4] goes out for 2 seconds while the engine is purged with helium and the igniter spark plugs are energized. When this phase is completed, the ignition-ready light comes on again.

27. Chamber and stage 2 igniter pressure gauge [76, fig. 4-1, 4-2, 4-3; 28, fig 4-4] – **Check (small pointer, 150 psi in about 5 seconds, when stage 2 is ignited)**. Flames should be observed inside the rocket engine bell (nozzle) as stage 1 and stage 2 are ignited.



The main chamber and stage 2 igniter pressure will increase during engine operation and will vary according to the movement of the throttle.

**Ready to launch!** *In the real world:* Countdown by carrier pilot.



*Igniter idle phase.*

## BALLISTIC CONTROL AND REACTION AUGMENTATION SYSTEM OPERATION

Since many missions will involve flight at altitudes where control surfaces are ineffective and where ballistic control system operation will be required to maintain airplane attitude, the ballistic control system should be turned on before launch. The reaction augmentation system (RAS)\* should be turned on as soon as possible after engine burnout. To turn on the ballistic control and reaction augmentation systems, proceed as follows:



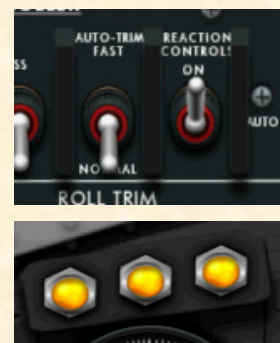
1. No. 1 ballistic control switch [65, fig. 4-1, 4-2, 4-3; 40, fig. 4-4] – **ON**.
2. No. 2 ballistic control switch [62, fig. 4-1, 4-2, 4-3; 50, fig. 4-43] – **ON**.



3. RAS function switches (X-15-2 aircraft only\*) [1-3, fig. 4-13] – **ENGAGE**.
4. RAS-out (amber) light (X-15-2 aircraft only\*) [42, fig. 4-2] – **OUT (OFF)**.

\*: There is no RAS installed in the X-15-2 equipped with the NACA vane-type boom nose. On the X-15-2 equipped with the NACA/Nortronics ball nose, the RAS panel is available as a separate panel, under the “Views/Instrument Panel” menu of the main FS window.

5. MH-96 system reaction controls switch (X-15-3 aircraft only) [6, fig. 4-14] – **ON (UP)**. Check that the MH-96 system indicator (amber) lights [90, fig. 4-3; 85, fig. 4-4] are on.





4. Propellant (helium) source pressure gauge [12, fig. 4-1, 4-2, 4-3; 13, fig. 4-4] – **Check (3300 to 3900 psi).**
5.  $H_2O_2$  source and purge pressure gauge [4, fig. 4-1, 4-2, 4-3, 4-4] – **Check (both pointers, 3300 to 3900 psi).**
6. Propellant tank pressure gauge [6, fig. 4-1, 4-2, 4-3; 81, fig. 4-4] – **Check ("L" pointer, 45 to 65 psi; "A" pointer, 45 to 65 psi).**
7.  $H_2O_2$  tank and engine control line pressure gauge [86, fig. 4-1, 4-2, 4-3; 79, fig. 4-4] – **Check (both pointers, 575 to 615 psi).**



*X-15-3 in flight.*

### NORMAL INDICATIONS DURING START

When the thrust chamber or chambers are fired, the following indications will be evident:

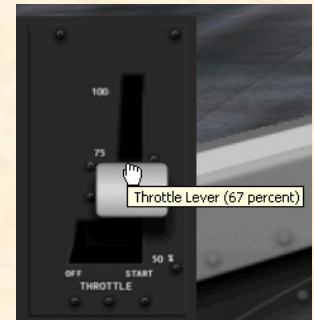
- ☐ Turbine whine;
- ☐ Turbine exhaust steam will be seen at the back of the aircraft;
- ☐ Liquid oxygen and ammonia will automatically stop bleeding overboard (as observed during prime);
- ☐ Liquid oxygen and ammonia manifold pressure will rise to rated values;
- ☐ Igniters will be operating;
- ☐ Chamber pressure will rise to a point where the igniters cease firing and chamber pressure will be shown on the indicator gauge;
- ☐ Airplane propellants will be consumed at a very high rate, as can be observed on the volume gauges [1-3, fig. 4-5] on the X-15 for Flight Simulator ser-

vice panel;

- ☐ Chamber pressure will reach rated values;
- ☐ Thrust chamber will emit a great deal of noise;
- ☐ Flames and exhaust gases (smoke, steam) will be seen at the back of the airplane.

### ENGINE THRUST CONTROL

Engine thrust is controlled by movement of the throttle between 50% and 100% thrust. Engine response to throttle movement is very rapid, 50% to 100% in approximately 1.5 seconds.



Remember that combustion in the main thrust chamber of the XLR-99 engine on the X-15 for Flight Simulator will occur almost instantaneously when the throttle lever [1, fig. 4-9] is moved from OFF to START 50%.

### NORMAL OPERATING CONDITIONS

The following conditions accompany normal rocket engine operation (see appendix 2 for more details):

#### XLR-99 engine:

1. Propellant source pressure gauge [12, fig. 4-1, 4-2, 4-3; 13, fig. 4-4] – **3200-3800 psi.**
2.  $H_2O_2$  source and purge pressure gauge [4, fig. 4-1, 4-2, 4-3, 4-4] – **3000 psi, gradually decreasing (both pointers).**
3. Propellant tank pressure gauge [6, fig. 4-1, 4-2, 4-3; 81, fig. 4-4] – **45 to 53 psi (both pointers).**
4. Propellant pump inlet pressure gauge [8, fig. 4-2, 4-3; 74, fig. 4-4] – **"L" pointer, 40 to 70 psi; "A" pointer, 40 to 55 psi.**
5. APU  $H_2O_2$  tank pressure gauge [64, fig. 4-1, 4-2, 4-3; 66, fig. 4-4] – **550 to 610 psi (both pointers).**
6. Cabin helium source pressure gauge [61, fig. 4-1, 4-2, 4-3; 59, fig. 4-4] – **1000 to 3400 psi.**
7. Hydraulic temperature gauges [58, 69, fig. 4-1, 4-2, 4-3] – **0° C to 150° C.**

opened, closed and adjusted using the **speed brake handle** on the throttle and speed brake side panel).

2. Pull the joystick **SMOOTHLY** to perform a 5-G to 7-G pullout to level flight at about 70,000 to 60,000 feet, after reentry (see fig. 5-1 on page 5-22).



*X-15-3 during her descent and about to perform a 5G pullout to level flight at about 65,000 feet.*

**NOTE:** The speed brakes on the X-15 aircraft were not designed for use as a low-speed drag device. Their design function was to provide the necessary drag conditions for control of the airplane at supersonic speeds and relatively high altitudes.

**\*CAUTION:** Remember that the X-15 possesses a very low lift-drag ratio. After the engine burned out, the aircraft would come down fast and steep. Because of the high rate of descent and the reduced stability at low Mach numbers, **the speed brakes are not to be used at full deflection below Mach 1.5.**

## **FUEL JETTISON**

While approaching the landing site, the remaining propellants must be jettisoned from the X-15 to minimize fire or explosion hazard upon landing and to lower the weight of the aircraft.

To jettison the remaining propellants from the X-15 airplane before landing or after an aborted launch, proceed as follows:

1. Source pressure [12, fig. 4-1, 4-2, 4-3; 13, fig. 4-4] – **Check.**
2. Vent, pressurize, and jettison control lever [3, fig. 4-

10] – **JETTISON.** Fuel jettison will be conducted concurrently on all three systems (liquid oxygen, ammonia, and hydrogen peroxide).

3. Jettison stop switches [4-6, fig. 4-6] – **JETT.**

In the spot plane exterior view, check for vapor emitting from the jettison ports, at the back of the X-15 aircraft. Propellant tank volume gauges [1-3, fig. 4-5], on the X-15 for Flight Simulator service panel, can also give a clear indication of the fuel being jettisoned.

*In the real world: Have chase pilots verify that fuel is jettisoning.*



*Before landing, the remaining propellants are dumped overboard through the jettison ports on the X-15-3 for Flight Simulator.*

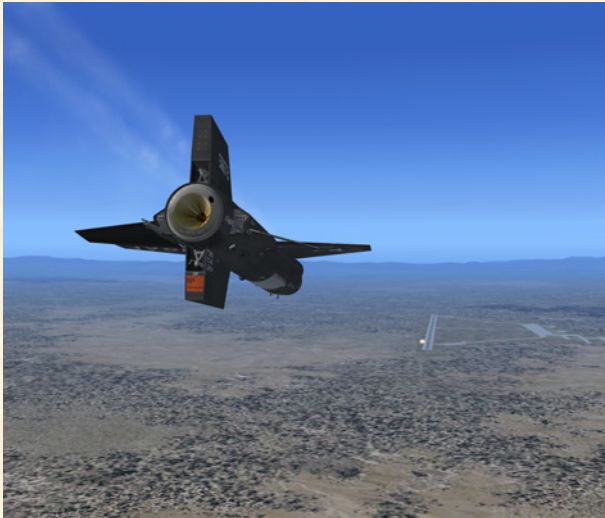
4. Vent, pressurize, and jettison control lever [3, fig. 4-10] – **VENT.** After propellants have been jettisoned, move control lever to **VENT.**

**NOTE:** The liquid oxygen and ammonia jettison ports are the long tubes protruding at the back of the airplane's side fairings (each side of the engine compartment). The hydrogen peroxide jettison port is located inside the lower speed brake compartment (right side). Because of some



limitations of the FS2004 platform, there is no special effect associated with the APU H<sub>2</sub>O<sub>2</sub> jettison.

## **BEFORE LANDING**



*X-15-3 approaching Edwards Air Force Base.*

1. Check all controls and instruments for landing.

See figure 5-2 on page 5-29 for the recommended landing pattern and procedures.

*In the real world: Before landing and in no case above 17,000 feet, move the vent, pressurize, and jettison control lever [3, fig. 4-10] to PRESSURIZE, to prevent sand and dust from entering the airplane propellant system.*



When the altitude is under 17,000 feet, proceed as follows:

1. Vent, pressurize, and jettison control lever [3, fig. 4-10] – **PRESSURIZE**.

## **LANDING**

To provide ground clearance for the landing gear, the lower ventral (rudder) must be jettisoned before landing.

**NOTE:** Under normal flight conditions, the ventral rudder should not be jettisoned except during landing approach.

When the altimeter [19, fig. 4-1; 26, fig 4-2; 25, fig. 4-3] indicates 5000 feet, proceed as follows:

1. Ventral arming switch [3, fig. 4-7] – **Check ARM.**
2. Ventral jettison button [2, fig. 4-6] – **Push (once).**



*In the real world: The ventral should be jettisoned at an altitude of about 5000 feet and at a minimum of 1500 feet above the ground.*

Pushing the ventral jettison button actually fires explosive bolts to release the ventral. Note that the ventral is also jettisoned automatically when the landing gear and skids are deployed.



*The ventral rudder is jettisoned before landing to make room for the rear landing skids. In the real world, a parachute will prevent the rudder from being damaged upon landing on the ground. The rudder would be recovered and reused. (X-15-1 shown here)*

To extend the flaps, turn the wing flap switch [1, fig. 4-10] on the left white console to **DWN** or use the “F8” key on your keyboard (or the appropriate button on your joystick).

To lower the landing gear, click the landing gear handle [9, fig. 4-1, 4-2, 4-3, 4-4; 1, fig. 4-6] on the left side panel or use the “G” key on your keyboard.

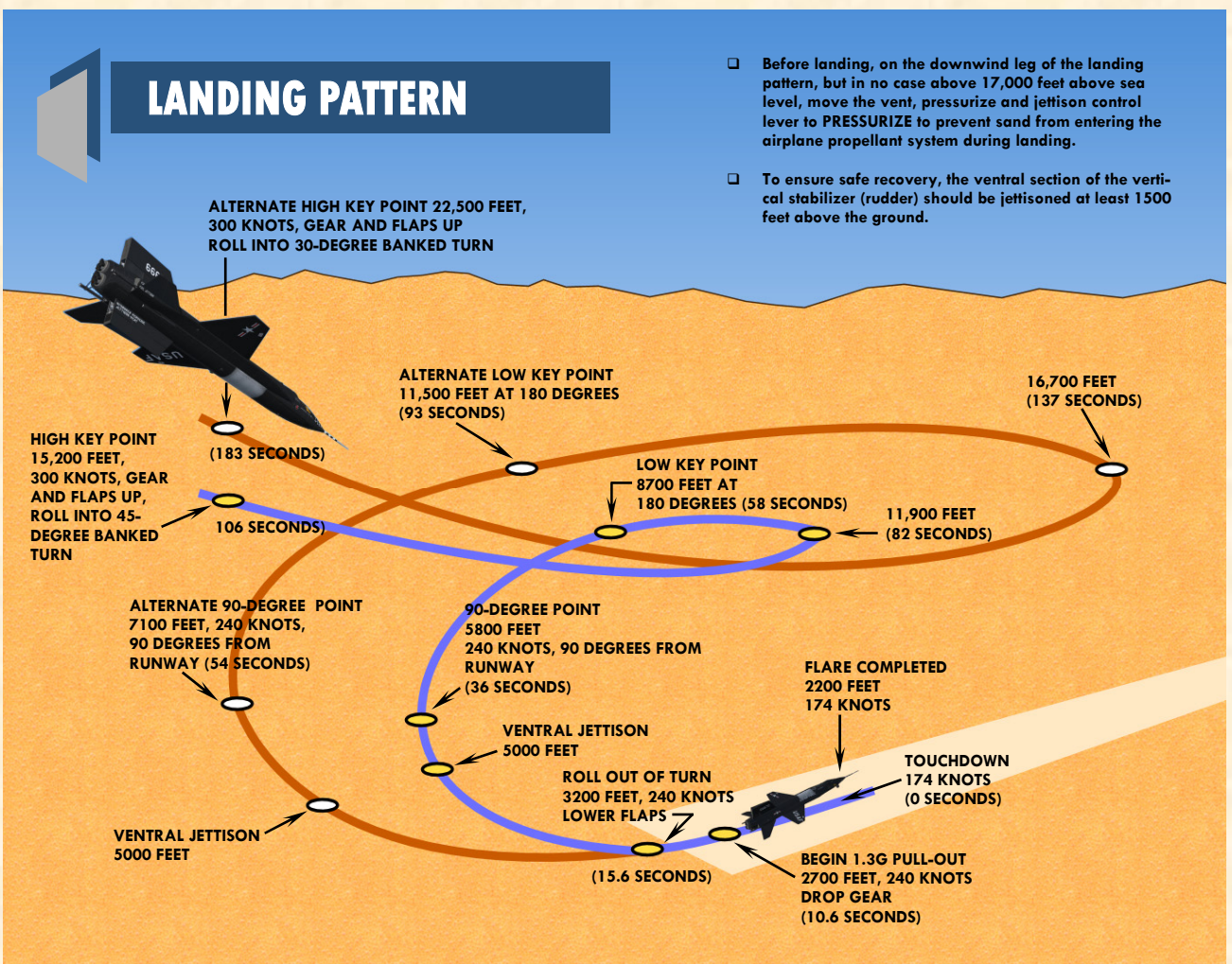


Figure 5-2



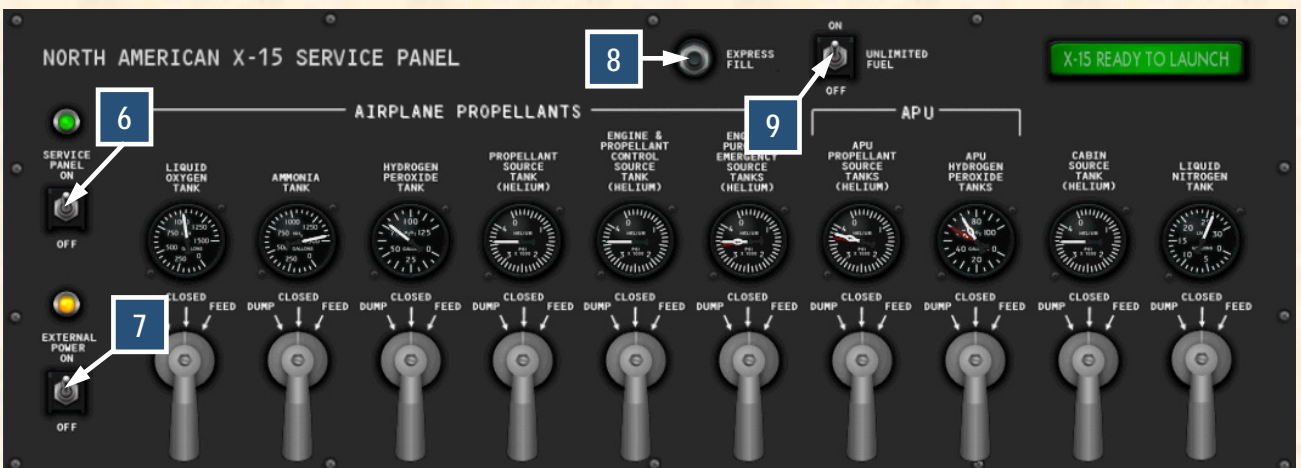
**XLR-99 ENGINE  
(LIGHT BLUE-GRAY PANEL, TYPICAL)**

**QUICK-START PROCEDURES**

**A**



**B**



## Appendix 2: INSTRUMENT READINGS

### INSTRUMENT READINGS AFTER SERVICING



The following conditions should be observed after servicing the X-15:

#### Service panel:

1. Liquid oxygen tank volume gauge [1, fig. 4-5] – **1017 gallons.**
2. Ammonia tank volume gauge [2, fig. 4-5] – **1445 gallons.**
3. Turbopump hydrogen peroxide ( $H_2O_2$ ) tank volume gauge [3, fig. 4-5] – **78 gallons.**
4. Propellant source (helium) tank pressure gauge [4, fig. 4-5] – **3200-3800 psi.**
5. Engine and propellant control source (helium) tank pressure gauge [5, fig. 4-5] – **3200-3800 psi.**
6. Engine purge and emergency (helium) tanks pressure gauge [7, fig. 4-5] – **3200-3800 psi, both pointers.**
7. APU source (helium) tanks pressure gauge [9, fig. 4-5] – **3200-3800 psi, both pointers.**
8. APU  $H_2O_2$  tanks volume gauge [10, fig. 4-5] – **60-75 gallons, both pointers.**

9. Cabin helium tank pressure gauge [12, fig. 4-5] – **3200-3800 psi.**
10. Liquid  $N_2$  tank volume gauge [13, fig. 4-5] – **25-30 gallons.**

#### Main panel (XLR-99 engine):

1. Propellant source pressure gauge [12, fig. 4-1, 4-2, 4-3; 13, fig. 4-4] – **3200-3800 psi.**
2.  $H_2O_2$  source and purge pressure gauge [4, fig. 4-1, 4-2, 4-3, 4-4] – **3200-3800 psi, both pointers.**
3. APU source pressure gauge [67, fig. 4-1, 4-2, 4-3; 65, fig. 4-4] – **3200-3800 psi, both pointers.**
4. Cabin helium source pressure gauge [61, fig. 4-1, 4-2, 4-3; 59, fig. 4-4] – **1000 to 3400 psi.**
5. AC voltmeters [43, 50, fig. 4-1, 4-2, 4-3; 45, fig. 4-4] – **200 volts (external power).**
6.  $H_2O_2$  tank and engine control pressure gauge [86, fig. 4-1, 4-2, 4-3; 79, fig. 4-4] – **“T” pointer, 0 psi; “C” pointer, 575-600 psi.**

### INSTRUMENT READINGS AFTER PROPELLANT SYSTEM PRESSURIZATION

#### (APUs operating)

The following conditions should be observed after propellant tanks have been pressurized and the APUs operating, but before the engine is ignited:



#### Service panel:

1. Liquid oxygen tank volume gauge [1, fig. 4-5] – **Approx. 1017 gallons.**
2. Ammonia tank volume gauge [2, fig. 4-5] – **Approx. 1445 gallons.**
3. Turbopump hydrogen peroxide ( $H_2O_2$ ) tank volume gauge [3, fig. 4-5] – **Approx. 78 gallons.**





**Xtreme Prototypes X-15-2/3 for Flight Simulator, Version 1.0 – Utility Flight Manual (English).** Copyright © 2007 by Xtreme Prototypes, Inc. The software and the present manual are protected by international copyright laws. Please do not make unauthorized copies of the software and/or its related components and documentation, including the present user manual. No part of this document may be reproduced or redistributed in any form or by any means without the written permission of the publisher. All images in this document are actual screenshots of the Xtreme Prototypes X-15-1, X-15-2/3 and X-15A-2 add-on rocket aircraft for Flight Simulator, taken in the Microsoft® Flight Simulator 2004 and Flight Simulator X game environments, except where otherwise noted. Microsoft, Microsoft Flight Simulator, Windows and DirectX are either registered trademarks or trademarks of Microsoft Corporation. Other company or product names mentioned herein may be trademarks or registered trademarks of their respective owners. Software features and manual contents are subject to change without notice.

*Portions of this manual have been inspired or adapted from the original real-world X-15 utility flight manuals published during the 1950s and 1960s by the U.S. Air Force and North American Aviation. NASA and AFFTC photos have been used in some sections for comparison and illustration purposes only and are the property of their respective owners as credited. Xtreme Prototypes is not affiliated with NASA, North American Aviation (Boeing), the U.S. Air Force, or any other company, entity or government organization related to the X-15 research program. This product is neither sponsored nor endorsed by NASA.*

***Xtreme  
Prototypes***

**[www.xtremeprototypes.com](http://www.xtremeprototypes.com)**

Xtreme Prototypes, Inc.  
P.O. Box 64, Station Place du Parc  
Montreal (QC), CANADA  
H2X 4A3

Produced with the financial participation of



Administrator of  
The Canada New Media Fund  
funded by the  
Department of Canadian Heritage

**Canada**